PG&E Vehicle Grid Integration

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Vehicle Grid Integration – Integrated Grid Planning and Innovation
PG&E and BMW Collaboration
2019 Charge Forward Pilot

Pilot Objectives

- Optimized EV charging:
  - Maximize renewable energy integration, while minimizing customer bill
  - Account for residential & away-from-home charging
  - Offer DR grid services
- Better understand customer engagement and the role of financial and non-financial incentives

Operations

- ~350 participants
- BMW proprietary aggregation software and telematics
- Participant web-portal and app to track and compare performance
- Various customer incentives and notifications, depending on use-case

Source and credit: BMW of North America, LLC

Key Findings

- Customers had a positive response to financial and non-financial incentives and modified charging habits
- Renewable energy integration and customer bill management possible through optimized charging window
- Optimization shifts EV charging to periods when renewable excess supply is high, especially midday

Lessons Learned

- Leaner customer enrollment process could help to increase participation
- Current commercial DR program requirements can still be a challenge for EVs:
  - Household baseline
  - Availability hours
  - 100 kW guaranteed of minimum capacity

Source and credit: BMW of North America, LLC
Pilot Objectives

- Goal was to complement EPIC 2.03 solar photovoltaics (PV) smart inverter assessment project by including electric vehicle related technology.

- EPIC 2.03.b – Vehicle to Home demonstration focuses on charging and discharging of the EVs in response to DR event (providing load drop by islanding the house) or hard islanding events in different configurations.

Outage Scenario – Days of resiliency for each configuration combined with PV system

- Electric vehicle (EV) adds significant incremental value when combined with stationary storage (SS) in long-term outage scenarios.

- Evidence from test results suggests that an EV-only V2H system can provide hard islanding and DR functionality.

Source: https://www.pge.com/pge_global/common/pdfs/about-pge/environment/what-we-are-doing/electric-program-investment-charge/PGE-EPIC-Project-2.03.pdf
V2H and V2G are technically feasible but not commercially available (nascent technology).

High customer interest in V2H (PG&E survey) but discouraged by high cost and implementation challenges (PCT).

V2H proved to be cost-effective responding to a demand response event from a program administrator standpoint (PACT) when purchased and installed by a customer.

Several barriers for V2H and V2G commercialization: customer’s upfront cost, battery warranty, unclear V2G path.